VOLKSWAGEN AG	**Lubricant for Threaded Fastening Elements with Electrolytically Applied Coatings or those of Stainless Steel** Requirements	**TL 521 32**
Konzernnorm		

Descriptors: lubricant, electrolytically zinc coated, Cr(VI)-free, stainless steel, threaded fastening element, screw, bolt, coefficient of friction

Changes

The following changes have been made as compared to Technical Supply Specification TL 521 32, 1986-01:

- Standard restructured
- Content revised

Previous issues

1986-01

1 Scope

This Technical Supply Specification stipulates the requirements for lubricants in electrolytically produced zinc and zinc alloy systems – Cr(VI)-free – for metric threaded fastening elements with surface protection types according to Volkswagen standard VW 137 50 and for joining elements made from stainless, high-alloyed chromium steel.

2 Designation

Lubricant according to TL 521 32

3 Requirements

3.1 General requirements

Approval of first supply and changes according to VW 011 55.

Avoidance of hazardous substances according to VW 911 01.

When fastening, the lubricant coating must

- reduce the coefficient of friction (total friction coefficient range μ_{tot} = 0.09 to 0.15; see VW 011 29) and
- narrow the scatter range.

as compared to untreated threaded fastening elements.

The lubricant coating must be suitable for Cr(VI)-free zinc coatings and must not itself contain Cr(VI).

In order to check the coating (Yes/No statement), a UV inhibitor must be contained as an indicator.

3.2 Standard part number

N 052 132 00

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3.3 Type

Water-dispersed synthetic polymers (PE suspension) that, after application and drying, produce a friction film/layer that is resistant to handling (commercial products include, for example, Microgleit DF 911/DF 921 produced by the Microgleit company, Gleitmo 605/625 from Fuchs Lubritec or Torque'N'Tension Control Fluid from the MacDermid company).

Note: The properties of the products differ in part and must be tested for the relevant application with respect to the friction coefficients to be achieved. Special influences such as threading speeds, counter layers and operational temperatures of the joining elements in contact must be taken into consideration.

Thus, for example, Microgleit DF 911, Gleitmo 605 and T'N'T Control Fluid are particularly suited for coating galvanized joining elements. Gleitmo 625 and Microgleit DF 921 are preferred for stainless steel joining elements; the coefficient-of-friction-reducing effect is particularly strong here.

The coating medium must be **silicone-free** and must not contain any substances that would require it to be labeled as hazardous to health (X_n) according to the Hazardous Substances Regulation.

3.4 Requirements for the lubricant coating process

- It must be ensured that no residues of chromic acid, chromic solutions or other acid residues can enter into the lubricant coating bath.
- A process-sure, even wetting of the surface with lubricant shall be guaranteed. Before the lubricant is applied, the parts to be coated should be **dry** and **warmed slightly** (approx. 40 °C to 50 °C; not above 75 °C). The temperature of the coating medium must not drop below 20 °C during the coating process (optimal: 25 °C to 35 °C; not above 75 °C).
- The coating medium is generally supplied as a concentrate. The mixing ratio of the coating medium concentrate and water must be selected such that the required friction coefficients are achieved and maintained. Empirical standard value: 1 part coating medium to 3 parts water (e.g., for Microgleit DF 911, Gleitmo 605 or Torque'N'Tension Control Fluid).
- The bath concentration shall be tested by determining the dry residue or using a refractometer, and documented.
- The bath must be checked (pH value) in accordance with the specifications of the coating medium manufacturer (frequency: minimum 1 x per shift/day, taking into consideration the specified limit values).
- Coated threaded parts should preferably be dried in a through-type system, but a centrifugal system is also possible. Drying must be performed at a speed suited to the parts spectrum and with the application of heat. The exact settings (speed, temperature, filling quantity) are to be determined by the coating operator in cooperation with the coating medium manufacturer, and documented. Here, the maximum permitted temperature for the coating system must be observed, e.g., max. 90 °C for Cr(VI)-free passivation treatments.
- In order to avoid the risk of condensation, the parts shall be packed in a dry state and only after reaching ambient (room) temperature.
- The efficacy of the lubricant coating with respect to the friction coefficients of the threaded fastening elements is to be checked in coordination with the accepting factory.

Note: If elements that have already been coated with lubricant are coated once again, this can yield different friction coefficients than for the first coating.

4 Referenced standards*)

VW 011 29	Limit Values for Coefficients of Friction; Mechanical Joining Elements with Metric ISO Thread
VW 011 55	Vehicle Supply Parts; Approval of First Supply and Changes
VW 137 50	Surface Protection of Metal Parts; Degrees of Protection, Codes, Requirements
VW 911 01	Environmental Standard for Vehicles; Vehicle Parts, Materials, Operating Fluids; Avoidance of Hazardous Substances

*) In this section, terminological inconsistencies may occur as the original titles are used.